



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/630,332

07/30/2003

Hyesook Hong

TI 35165

8758

23494

7590

05/16/2008

TEXAS INSTRUMENTS INCORPORATED

P O BOX 655474, M/S 3999

DALLAS, TX 75265

EXAMINER

POMPEY, RON EVERETT

ART UNIT

PAPER NUMBER

2812

NOTIFICATION DATE

DELIVERY MODE

05/16/2008

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

uspto@ti.com

uspto@dlemail.itg.ti.com

Office Action Summary	Application No. 10/630,332	Applicant(s) HONG ET AL.	
	Examiner RON E. POMPEY	Art Unit 2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 February 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 and 20 is/are pending in the application.
- 4a) Of the above claim(s) 1-8 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 9-18 and 20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 13 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. Claim 13 recites the limitation "wavelength" in line 2. There is insufficient antecedent basis for this limitation in the claim. The examiner does not know what the wavelength is pertaining to; however, has, for the purpose of making a rejection, taken it to mean the wavelength of the exposure tool.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 9-12, 15, 18 and 20 is rejected under 35 U.S.C. 102(e) as being anticipated by Kent (US 6130016).

Kent discloses the limitations of:

Claim 9: providing a reticle layer over a reticle substrate, said reticle layer including each of:

a patterned feature area (lower row of widely spaced patterns 220, fig. 3a) corresponding to a desired circuitry pattern; and

a test pattern area (upper row of closely spaced patterns 220, fig. 3a), wherein a portion of said test pattern area is within a step-distance of a portion of said patterned feature area (col. 6, Ins. 14-40);

patterning a resist material by stepping said reticle, the patterning including each of the patterned feature area and test pattern area incorporated in said reticle layer; and

visually inspecting said material for light and dark regions (coherence and numerical aperture values) within said test pattern area, said light and dark regions representing a corresponding variance in said patterned feature area of the resist material. (col. 6, ln. 45 – col. 7, ln. 51)

Claim 10: wherein said portion of said test pattern area (upper row of closely spaced patterns 220, fig. 3a) is a first portion of said test pattern area and said portion of said patterned feature area (lower row of widely spaced patterns 220, fig. 3a) is a first portion of said patterned area and wherein said first portion of said test pattern area is within a step-distance of said first portion of said patterned feature area and a second portion of said test pattern area is within a step-distance of a second portion of said patterned feature area, a variance between said first and second portions of said test pattern area being indicative of a variance between said first and second portions of said patterned area (fig. 4B);

Claim 11: wherein said test pattern area creates a reflective grating in said patterned resist material and said reflective grating is configured to provide said light and dark regions if said variance in said patterned feature area exists (fig. 4B; col. 7, Ins. 9-51);

Claim 12: wherein said reflective grating includes a reoccurring line/space structure (patterned photoresist/metal; col. 7, ln. 1-40);

Claim 15: wherein said variance is a systematic variance in critical dimension (CD) in said test pattern area (cd = linewidth; col. 6, Ins. 1-10) ;

Claim 18: patterning a resist material by stepping a reticle, wherein said reticle includes each of:

a patterned feature area (lower row of widely spaced patterns 220, fig. 3a) corresponding to a desired feature of a semiconductor device; and

a test pattern area (upper row of closely spaced patterns 220, fig. 3a), wherein a portion of said test pattern area is within a step-distance of a portion of said patterned feature area; and

visually inspecting said patterned resist material for light and dark regions (coherence and numerical aperture values) within a corresponding test pattern area, said light and dark regions representing a systematic variance in critical dimension (CD) in said patterned resist material (fig. 4b);

using said patterned resist material to form the feature of a semiconductor device after said visually inspecting (col. 6, ln. 45 – col. 7, ln. 51).

Claim 20: wherein said patterned resist material is used to form multiple features, and wherein said multiple features are electrically contacted to form an operational integrated circuit (col. 6, Ins. 1-6).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kent (US 6130016), as applied to claim 12 above, in view of Ausschnitt et al. (US 5,914,784).

Kent reads on the claims as applied above, but does not disclose the claimed limitation(s) of:

Claim 13: wherein said reoccurring line/space structure has a pitch of less than about $3/2$ the wavelength in use;

However, it would have been obvious to one of ordinary skill in the art at the time the invention to form test pattern areas with reoccurring line/space structure that has a pitch of less than about $3/2$ the wavelength in use, since it has been held that where the general conditions, the width of the lines in the reoccurring line/space structure, of a claim are disclosed in prior art, discovering the optimum or working ranges involves only

routine skill in the art. (see *In re Aller*, 105 USPQ 233.) Because the pitch of the test pattern area will help find variances visually.

8. Claims 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kent (US 6130016), as applied to claims 9-12 above, in view of Ausschnitt et al. (US 5,914,784).

Kent reads on the claims as applied above, but does not disclose the claimed limitation(s) of:

Claim 16: wherein visually inspecting said material includes visually inspecting said material using an optical microscope; and

Claim 17: further including changing a focus on said optical microscope to cause said light and dark regions to become more or less pronounced.

However,

a. Ausschnitt discloses the above claimed limitations regarding:
wherein visually inspecting said material includes visually inspecting said material using an optical microscope; and
further including changing a focus on said optical microscope to cause said light and dark regions to become more or less pronounced in Abstract.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Kent with Ausschnitt, because the optical microscope helps inspect a patterned material.

2. Claim 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kent (US 6130016), as applied to claims 9 above, in view of Asano et al. (US 6741334).

Kent reads on the claims as applied above, but does not disclose the claimed limitation(s) of:

Claim 14: wherein said test pattern area is located in a scribe region defined by said patterned feature area.

However,

b. Asano discloses the above claimed limitations regarding:

wherein said test pattern area is located in a scribe region defined by said test pattern area(col. 5, Ins. 45-60; wherein the patterned chrome is the reflective grating and the scribe region is the peripheral region outside of the pattern region).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify where the test pattern is placed in Kent with placing the test pattern area in the scribe region in Asano because allow you to use more of the wafer for the actual devices.

Response to Arguments

3. Applicant's arguments with respect to claims 9-18 and 20, filed 2/13/08, have been considered but are but are held not persuasive.

Applicant argues that Kent does not include both patterned feature area and test pattern area within the same reticle, because a calibration reticle is being used.

However, the calibration reticle patterns both the feature pattern area (lower row of widely spaced patterns 220, fig. 3a) and test pattern areas (upper row of closely

spaced patterns 220, fig. 3a), when calibrating the device for operation. Kent discloses that the patterns, formed on the test layer from the calibration reticle, are formed and optimized, see 411, fig. 4A and fig. 4B, which includes the feature pattern area and test pattern area of the calibration reticle.

Applicant argues that that Ausschnitt does not disclose wherein said reoccurring line/space structure has a pitch of less than $3/2$ the wavelength. However, Kent discloses that the wave length of the exposure tool affect the linewidth (col. 1, ln. 60 – col. 3, ln. 3), which affect the pitch of the structure. Therefore, the prior art references do suggest a relationship between the wavelength and pitch.

Additionally, the case law cited by the applicant "However, if the variable is "result effective" then it is acceptable to seek optimization of that variable. See MPEP § 2144.05 IIB.". MPEP § 2144.05 IIB states that "A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation." , which means that the optimization of that variable can be characterized as routine experimentation and not inventive.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Ehrichs (US 6522776) discloses a reticle with test area and pattern area.

Benjamin et al. (US 4357540) discloses a reticle with test area and pattern area.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to RON E. POMPEY whose telephone number is (571)272-1680. The examiner can normally be reached on 9AM - 5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on (571) 272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Zandra V. Smith/
Supervisory Patent Examiner, Art
Unit 2822

Ron Pompey
AU: 2812
5/9/08